

**BEFORE THE PUBLIC
UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA**



FILED
9-15-16
04:59 PM

Application of Pacific Gas and Electric
Company for Approval of the Retirement of
Diablo Canyon Power Plant,
Implementation of the Joint Proposal, And
Recovery of Associated Costs Through
Proposed Ratemaking Mechanisms
(U 39 E)

Application 16-08-006
(Filed August 11, 2016)

APPENDIX TO ENVIRONMENTAL PROGRESS'S PROTEST

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Filed and served September 15, 2016.

APPENDIX

- Interview with Michael Thomas, Assistant Executive Officer, Central Coast Regional Water Quality Control Board, interviewed January 12, 2016
- Interview of Pete Raimondi, expert consultant to regional water board. Professor at UC-Santa Cruz ecology and evolutionary biology, interviewed January 8, 2016
- Interview with John Steinbeck, Tenera Consultants, January 8, 2016

Michael Thomas, Assistant Executive Officer, Central Coast Regional Water Quality Control Board; Interviewed by Michael Shellenberger; 3:45 pm January 12, 2016.

Who are you what is your role here?

I am the Assistant Executive Officer and the head of our enforcement unit. Almost all of the enforcement actions go through me. I was the lead staff person in 2000 and worked with Pete Raimondi, and hired him to assist us. And I worked with PG&E's consultant John Steinbeck. Pete's a great guy and a great scientist, John is also really good.

Where is the whole process at?

Back then we did all the environmental studies and there were two issues. What gets sucked in — entrainment — and the discharge of water 22 degrees above background levels.

In Regional Water Board staff's opinion, there were only significant environmental impacts from entrainment, and for PG&E to renew its permit, we said they had to address them.

So we came up with proposal for regional board to settle all of those impacts. We came up with a package that comprised several million in projects and the setting aside about 2,000 acres of land north of the power plant in a conservation easement.

The Board in 2000 and again in 2003 did not accept the settlement, and at the same time EPA decided that they were going to revise their Clean Water Act 3060b regulations that govern intake, entrainment and impingement. The EPA set out to advise and that put us on hold. EPA finally revised and adopted the the new regulations. But then the State Water board in Sacramento decided to adopt their own policy, and that took several years.

So now we're back to renewing a discharge permit for Diablo and we have to look at all those issues again. We have to look at the work we did previously, and the work we did since, and come up with a proposal for settling all the issues.

When will the process be finished?

We want to bring a proposal to the board in January 2017 to revise the permit

What will you do between now and then?

We have to revise the draft, update the draft, and work with the State Water Board because the state has some authority over the mitigation of impacts from OTC policy.

How did feds change rules and how did state change theirs?

I think the Feds basically affirmed their rule — which was very controversial — that the power companies have to do everything to minimize impacts, including imposing closed cycle cooling where it's feasible to do so

California State decided similarly. There are categories for different plants and nuclear has its own category. Nuclear has extra time for studies and analyses for minimizing impacts and deciding whether it's feasible.

Are cooling towers feasible?

I don't think they are feasible or optimal. There have been multiple studies for towers that aren't feasible. We hired our own consultants separate from PG&E and they came to same conclusion. We did a lot of work but the State Water Board put together their own review panel and looked at all these issues again after we did.

Will the Regional Board or State Board decide?

Both boards have a role, but the Regional Water is who decides whether to adopt cooling towers. On entrainment and impingement we will work with State Water Board executive director Tom Howard.

What is the main issue?

Entrainment is a significant issue because the volume of water is 2.5 billion gallons per day. We estimated larvae and our position was it is a potentially significant impact and so some level of mitigation is needed. How do you quantify that? It's extremely difficult because you're dealing with larvae — how do you put a price on that? And how do you mitigate for it? Do you do off-shore reefs, wetlands? And how much? They did that at San Onofre and it's very controversial as to what to do about it and how much to do about it. You have scientists on both sides. Some say you should do a substantial amount of it and others say it's relatively insignificant.

Have you found any change to fish populations over time?

No we haven't. The problem is that fish populations go up and down dramatically and there's so much data you can't determine cause and effect like from a power plant.

So we just assume that there is an impact and err on the conservative side.

What are the factors?

There are many factors including seasonal warming, El Nino, warming from the blob, climate change, and just the general warming of the ocean — plus fishing. We have fishing pressure all along the central coast, and now we have marine protected areas. There's one to the north of Diablo canyon, so you have all of these things acting on the fish population.

Is the pretense that science? Or do other things come in to play?

Both. A State panel recommended to the state board that power plants pay a fee. They looked at the data and converted entrainment losses into habitat. They asked how much habitat would it take to create the loss by power plant. You do that conversion and you ask how much is that worse. And they simplified and now we can look at volume of water by power plant and we can convert to acres and dollars.

How much money would it likely cost if PG&E paid by volume of water?

For Diablo, if you go through the calculations, OTC comes out to \$4.3 million per year, for 2.5B gallons a day. PG&E can pay the \$4 million per year. The State Water Board preference is that that the money goes toward supporting and implementing the marine protected areas. So if you establish marine protected areas, it would help make up for losses by the power plant.

Could Water Board staff make such a proposal for mitigation?

Yes. I anticipate we'll be talking to PG&E about exactly that. Asking them what they propose. Policy allows PG&E to propose option. They can say we have already done x, y, and z environmental projects and we want that to be accepted as mitigation. There's a power plant that just did that a few months ago.

Is it even likely you'd come back with something as small as \$4 million a year?

Well, if it operates 10 years, that's \$40 million. If it operates 20 years, that's \$80 million.

Is that your ballpark estimate?

I don't know. When we did it with PG&E it was several million plus the land. Now we have to bring into context today's State Water Board policy to minimize entrainment and impingement to level of cool water or something else. They could pay \$4.3 million a year, or they could propose something else. What they propose is pretty wide open.

They could say they've already taken mitigation measures that should be taken into account. There's only one case where a power company has done that, and it was approved.

I would expect PG&E to document everything they have done that they could consider beneficial to environment and make that as compelling as possible.

Why is everyone asking whether plant can survive?

Good question. The other thing is the re-licensing with the Public Utilities Commission and the Coastal Commission. They need to get a renewal for extending their license.

Couldn't the Regional Water board still decide to make PG&E build towers?

Our staff's opinion is based on the review of the evidence which is that cooling towers are not feasible. There are organizations that disagree with us and they will be present and involved and will

argue that we should not permit. But I want to clarify that board makes its own decisions.

When will the board vote?

Depends. If it's not controversial, they may decide in one meeting. But controversial topics might take several meetings, and board meetings are several times each year. We could be dealing with it for the first part of next year.

Interview of Pete Raimondi, Professor at UC-SC ecology and evolutionary biology; Interviewed by Michael Shellenberger at 1:30 pm on January 8, 2016.

Can you help me understand who are you and your role here?

I work for the State of California, the California Coastal Commission, the California Energy Commission, and the Regional Water Board for assessments of power plants, desalination plants, and for designing mitigation.

The State Regional Water Quality Control Board is the regional group that administers the State Water Board's [National Environmental Policy Act's] NEPA determinations, 316a and 316b. The first, 316a is thermal effects, and 316b is intake effects. I typically do intake effects.

The State convened two technical working groups in the 1990s on thermal and entrainment. Both came up with results.

I'll only tell you about intake. We were charged with working with consultants hired by PG&E to come up with independent assessments. The State people would address questions of interest to intake impacts under 316b.

We had agreement with PG&E that we would have oversight of assessment. [PG&E's consultant] Tenera did a great study. There was no difference of opinion over the design or the results or the math. But there was a difference over whether there was an impact and, if so, its magnitude, and how much it should be. [PG&E

and Tenera] proposed a mitigation package that I thought was not enough to compensate for the losses found in study.

But before anything happened, PG&E declared bankruptcy. So it stalled because PG&E declared bankruptcy. So that stopped progressing.

What was the mitigation PG&E proposed?

They proposed a whole bunch of things for mitigation. We came up with a counter package for intake. They proposed a package for thermal and intake. We proposed a suitable mitigation for intake.

We proposed to use information collected to come up with a loss to the biology. The mitigation intent was to provide those resources, to have “complete compensation,” as we call it. The key word is “compensatory” mitigation.

In this situation we proposed compensatory mitigation through habitat creation. Most species affected were ones associated with rocky subtidal reefs. So we proposed they build artificial reefs. There was precedent in southern California for SONGS where a compensatory reef was built and is still operating.

How much would your package have cost?

I can’t remember exact figures but the ballpark was a \$20 - \$30 million difference between the two mitigation proposals. Ours was something like \$35 million and theirs was like \$5 million.

Is building an artificial reef much more than dumping rocks on a sandy beach?

It’s a little harder than that. You have to have a particular sand, otherwise the whole reef will sink. The cost of the construction of the San Onofre artificial reef was \$30 to \$35 million, and that’s close to the estimate from Diablo.

Isn’t 30 million a bargain mitigation for once-through cooling?

I agree. When [utility] staff analysts look at it next to net operating profits, it's typically not noticeable on the ledger. It's a fraction of all the other costs going on. At the time PG&E was suffering for reasons that didn't have to do with mitigation and ultimately filed for bankruptcy. At the time they made the reasonable claim they couldn't afford. But the idea was that something would happen, and it didn't.

Why?

I don't know. The State just dropped. Coming out of that period we went through high growth in the State and there were brownouts and everyone was worried about the plants going off line. A huge amount of the electricity was in the two nukes [San Onofre and Diablo Canyon] at the time and they worried about brown-outs.

John Steinbeck, Tenera, Interviewed by Michael Shellenberger; 3:21 pm
January 8, 2016

You worked for PG&E to evaluate how to handle its once-through cooling. How long have you been working on this?

I've been out there for 30 years. I wrote the report that me and [UC-Santa Cruz professor and Water Board Consultant] Pete [Raimundi] were coauthor on that became the guidelines. All of these intake assessments have to use our approach. Pete and I are friends but we're on opposite sides. But we have a lot of respect for each other.

Is it true the State Water Board is likely to require PG&E build cooling towers at Diablo Canyon?

There's a large misconception of what the State did with [the Federal Clean Water Act's] once-through cooling [OTC] requirement. I keep seeing wrong stuff in print. The State did not make OTC illegal or stop the use of OTC. Plants can still use OTC, they just have to initiate some kind of useful measures, operational or technological, to reduce the effects of OTC. [Natural gas power plant] Moss Landing has an agreement with state on

how they're going to do that. The other carve-out was nuclear plants. The State recognized that they couldn't go in and jeopardize nuclear safety. So, the State was going to require Diablo to do a lot of work, but I am assuming they're going to do mitigation since it doesn't make sense to try to retrofit the plant.

Why then is PG&E saying it might shut Diablo down?

PG&E may make the decision to shut Diablo Canyon down but under existing state regulation they can continue to operate without building cooling towers. PG&E just needs the Board to make decision that we're going to do this or that and then come up with a proposal and then they're going to move forward with that. I don't understand why PG&E is so concerned.

How much could mitigation cost PG&E?

Mitigation may cost them \$200 million. That's what [closed nuclear plant] San Onofre shelled out to the Coastal Commission [to build an artificial reef]. Maybe it goes up to \$300 million. Whatever it is, it will be a lot less than billions.

How then did the conversation ever even get to \$6 billion cooling towers?

[California Environmental Quality Act] CEQA required the study as part of the regulations. CEQA required PG&E to look at all options to reduce the effects of OTC that was reasonable and cost effective and didn't threaten safety. But CEQA never required PG&E to get rid of OTC, just to look at the options from a realistic standpoint, select an option, and get it approved.